4 - Safety

Policy

***Firefighter and public safety is the first priority. All Fire Management Plans and activities must reflect this commitment*.**

(Federal Wildland Fire Policy, December, 1995)

***Every BLM supervisor, employee, and volunteer is responsible for following safe work practices and procedures, and identifying and reporting unsafe conditions*.**

(BLM Manual 1112-2, *Safety and Health for Field Operations*)

Overview

We are committed to Zero Tolerance of carelessness and unsafe actions. The commitment to and accountability for safety is a joint responsibility of all firefighters, managers, and administrators. All land management plans and all suppression plans and actions must reflect this commitment. Individuals must be personally committed and responsible for their own performance and accountability. Please join us in adopting firefighting's code of safe practices:

Safety Comes First on Every Fire, Every Time.

The Ten Standard Fire Orders are Firm. We Don't Break Them; We Don't Bend Them. All Firefighters have the Right to a Safe Assignment.

Every Firefighter, Every Fireline Supervisor, Every Fire Manager, and Every Agency Administrator has the Responsibility to Ensure Compliance with Established Safe Firefighting Practices.

Bruce Babbitt and Dan Glickman, Secretaries of Interior and Agriculture

Objectives

The goal of the fire safety program is to provide direction and guidance for safe and effective management in all activities. Safety is the responsibility of everyone assigned to wildland and prescribed fire, and must be practiced at all operational

levels–from the director, state director, field office, and area manager–to employees in the field. Agency administrators need to stress that firefighter and public safety always takes precedence over property and resource loss. Coordination between the fire management staff and unit safety officer(s) is essential in achieving this objective.

For additional safety guidance and references refer to:

- *Fireline Handbook* (PMS 410-1, NFES 0065)
- *Incident Response Pocket Guide* (PMS 461, NFES 1077)
- *BLM Safety Handbook 1112-2*

Food & Nutrition

Nutritious food can be a morale booster, but more importantly, it fuels muscles for hard work and internal organs for health and fitness. A firefighter may burn 5,000 to 6,000 calories a day. These calories must be replaced to avoid cramping, fatigue, and impaired judgement. Government-provided food must be low in fats and high in complex carbohydrates.

Drinks provided must replace essential fluids lost from the body during exercise. On a normal fireline assignment, firefighters may replace 12 or more quarts of fluids a day. In some cases, firefighters may need to replace one to two quarts of fluids per hour. Water is an excellent way to replenish fluid loss. Natural juices and sport drinks contain energy-restoring glucose. Avoid caffeinated, carbonated, and "diet" drinks.

Fatigue

Firefighting is hard, dirty, and inherently dangerous work. The fire itself creates much of that danger. But there is a less visible threat–fatigue. Without enough sleep and rest, after long hours in heat and smoke (or stressful office settings), even the fittest worker tires. Fire management staff, dispatchers, and support personnel are subject to long hours and high levels of stress. At any level in the fire organization or management, fatigue can lead to mistakes which result in accidents and injuries. Here are three areas to monitor:

Work and Rest

Sleep is a prime factor in overcoming fatigue. It is possible to force tired muscles to keep on working, but the brain can't function properly without sleep. Accidents

and injuries result among those pushed too hard. The NWCG *Interagency Business Management Handbook* has established work and rest guidelines for incident management. However, these are not evenly applied by managers of initial attack crews. For this reason managers and incident management teams should establish work and rest schedules that minimize fatigue in the following ways:

- Establish record-keeping systems that track crew work time.
- Plan and strive to provide one hour of sleep or rest for every two hours worked.
- When deviating from work/rest guidelines, the agency administrator or incident commander (IC) must approve in writing.
- Start each operational period with rested crews.
- Provide an adequate sleep environment.
- Breaks during fire operations should be from 10 to 30 minutes in length.
- Frequent breaks of between 10 to 30 seconds should be encouraged.

The pulse is a good way to gauge fatigue. The pulse should recover to less than 110 beats per minute; if not, a longer break is needed. A firefighter's wake-up pulse can signal potential problems. If it is 10% or more above normal, it can mean fatigue, dehydration, or even a pending illness.

Heat Stress

Heat becomes a problem when humidity, air temperature, and radiant heat combine with hard work to raise body temperature beyond safe limits. Sweat is your main defense. Everyone on the fireline must understand the importance of drinking water often.

There are three forms of heat stress. The mildest is heat cramps. Heat stress can progress to heat exhaustion and eventually heat stroke. **Heat stroke is a medical emergency!** Delayed treatment can result in brain damage and even death. At the first sign of heat stress, stop work, get into the shade, and begin drinking fluid.

Smoke and Carbon Monoxide

For decades, firefighters and fire managers have been concerned about the health effects of smoke from wildland and prescribed fires. In 1997, a NWCG

team studying the short and long-term effects of exposure to smoke reached consensus on a risk management plan that could be implemented within the existing fire management structure.

In brief, participants concluded that while toxic emissions were present in smoke, that the incidence of exposure in excess of OSHA permissible exposure limits was relatively low (fewer than five percent of prescribed fire cases, even less in wildfire), and that documented health effects were moderate and often reversible.

Call USDA Forest Service, Technology and Development Program, Publications, (406) 329-3978, and ask for *Health Hazards of Smoke, Recommendations of the Consensus Conference*, April 1997 (Item Number 97512836). Copies are available free of charge in limited numbers

Minimizing Exposure to Smoke in Wildland Fire Improving tactics should help minimize exposure:

- Include smoke hazards on the ICS-215A worksheet at planning and briefing sessions.
- Use flanking attack as opposed to head attack (where appropriate), in heavy smoke situations.
- Minimize mop-up when possible.
- Adjust operational periods on mop-up to avoid periods of inversion.
- Use time and patience instead of water to put the fire out: use burn piles, allow areas to burn themselves out. Rely on burn-up instead of mop-up.
- Minimize snag falling, consistent with safety concerns, to avoid putting heavy fuels on the ground that will require mop-up.
- In heavy smoke conditions, give up acres to gain control.
- Fire behavior forecasts should discuss smoke and inversion potentials.
- Locate camps and incident command posts in areas that are not prone to inversions.
- Reduce dust by watering roads at the incident, on drier roads leading to the incident, and in the incident base area.

- Use minimum impact suppression techniques (MIST).

Driving Limitations

The Federal Motor Carriers Safety Regulations, Part 393.3, and state laws, restrict those drivers whose assignment requires a commercial driver's license (CDL) (vehicles over 26,001 lbs. and all buses) to 10 hours driving time in a 15-hour duty period, with 8 hours off between shifts.

Drivers whose duty is not limited by this law may not exceed 10 hours driving time in a 16-hour duty period, and must have 8 hours off between shifts.

Agency administrators or their designees can extend these hours on incidents, (e.g., first burning period, initial attack, 24-hour shifts), after they complete an analysis, and provided the extension of shift length contributes to increased firefighter safety.

Personal Protective Equipment (PPE)

All operational personnel on wildfires and prescribed fires are required to use PPE. Employees must be trained to use safety equipment effectively.

Common permanent-press materials are not to be worn, as they melt and stick to the skin when exposed to flame or heat. Because most synthetic fibers melt when exposed to flame or extreme radiant heat, personnel should wear only undergarments made of 100 percent cotton or wool, aramid, or other fire resistant material.

Required PPE includes:

- 8" high laced leather boots with lug soles (condition of hire)
- Fire shelter
- Hard hat with chin strap
- Aramid shirts
- Aramid trousers
- Leather gloves

The JHA will determine when eye and hearing protection is required.

Special PPE and a job hazard analysis (JHA) is required for operations involving aluma-gel. Aluma-gel mixing crews must be equipped with eye protection, fire retardant anti-static or 100 percent cotton coveralls, dust masks, and gloves.

Head Protection

Personnel must be equipped with hard hats and wear them at all times while on the fireline. Hard hats must be equipped with a chin strap–which must be fastened while riding in, or in the vicinity of, helicopters.

Helicopter crew persons and helitack crews will be issued and wear flight helmets–with chin strap securely fastened when riding in helicopters. All contract helicopter personnel must comply with this standard.

Acceptable helmets for fireline use are "Helmet, safety, plastic" (NFES 0109, 8415-01-055-2265/GSA) listed in NWCGs *National Fire Equipment System Catalog: Fire Supplies and Equipment,* or equivalent helmet meeting 1977 NFPA Standard requirements.

Eye and Face Protection

The following positions require the wearing of eye protection: nozzle person, chainsaw operator/faller, heliport and ramp personnel, and retardant mixing crew. Other personnel in the immediate vicinity of these operations may also require eye protection. Face shields providing full face protection must be worn by Terra-Torch® nozzle operators and power sharpener operators.

Hearing Protection

Personnel who are exposed to a noise level in excess of 80db must be provided with, and wear, hearing protection. This includes, but is not limited to, chainsaw operators/fallers, pump operators, helibase and aircraft ramp personnel, retardant mixing personnel, and any other personnel exposed on a regular basis to damaging noise levels.

Seasonal fire suppression personnel must be issued two pairs of earplugs (either universal or fitted), at the beginning of the fire season. Other fire crew members must be issued earplugs upon fire assignment. Personnel must be trained to use and clean earplugs to prevent hearing damage and hygiene problems. Hearing protection may be required on helicopter flights.

Face and Neck Protection

Nomex® "shrouds" are not required PPE. If used, the shrouds must meet the design and performance requirements identified in the NFPA 1977 Standard on Protective Clothing and Equipment for Wildland Fire Fighting, 1998 ed.

Leg Protection

Chainsaw chaps, in good condition, must be worn by all chainsaw operators/ fallers and swampers.

Foot Protection

Personnel assigned to fires must wear heavy duty, all leather, lace-type work boots with non-slip (Vibram type), melt-resistant soles and heels. The leather top must be at least 8 inches in height, measured from the top of the heel (Alaska exempt). The boots are a condition of hire for firefighting positions and are purchased by the employee prior to employment.

Fire Shelters

Fire shelters will be issued and worn by all line personnel. They will be inspected regularly, and "training" shelters will be deployed annually at required refresher safety training. Supervisors and firefighters must never rely on fire shelters instead of using well-defined and pre-located escape routes and safety zones. **The shelter is to be viewed as a last resort, and will not be used as a tactical tool.**

Fireline Safety

Incident Briefings

The fire manager must ensure that safety briefings are occurring throughout the fire organization, and that safety factors are covered with incident personnel at all operational briefings through the IC. The identification and location of escape routes and safety zones must be stressed.

The IC, Safety Officer, Fire Behavior Analyst, and remainder of the command and general staff will use the 10 Standard Fire Orders, 18 Watch Out Situations, and the LCES Analysis of Tactical Applications on the Incident Action Plan Safety Analysis (ICS 215-A) for guidance at strategy meetings, during briefings, and when developing the incident action plan, safety message, and medical plan.

LCES–a System for Operational Safety

L – Lookout(s)

C – Communication(s)

E – Escape Route(s)

S – Safety Zone(s)

LCES is a safety procedure put in place before fighting the fire. It is a self-triggering mechanism that functions sequentially: lookouts assess–and reassess–the fire environment; lookouts communicate to each firefighter threats to safety; firefighters use escape routes and move to safety zones.

- Before safety is threatened, each firefighter must be informed on how the LCES system will be used.
- The LCES system must be continuously reevaluated as fire conditions change.

While individual lookouts may be designated and posted, all firefighters should be alert to changes in the fire environment and have the authority to initiate communication.

Using the Principles of LCES for Risk Analysis

"Safety" is defined as *freedom from exposure to danger, exemption from injury, and to protect from accident.* Being safe requires knowledge and skill in methods of avoiding accidents, injury, and exposure to hazards. As such, it requires an ability and attitude that grows with experience and training.

In fire management activities there are objective and subjective hazards. The objective hazards, such as fire entrapment, snags, rolling debris, and terrain cannot be eliminated–these are risks inherent to firefighting. The possibility of injury or entrapment is always there; the probability may be large or small.

Subjective hazards are those that we create and also have control over (attitudes and abilities). By using a set procedure during each operational period, we can ensure our safety by taking the following steps to minimize our exposure to hazards:

- Define the assignment.
- Identify the hazards.
- Analyze and reevaluate the situation as it changes.

In the following "Risk Analysis" section, answer each question by checking the appropriate column. For each question answered with a No, the principles of LCES become important responses to reduce the risk of entrapment.

Risk Analysis

Situation	Considerations	Yes	No
Fight Fire Aggressively but Provide for Safety First	• Is the suppression method adequate? • Are there adequate resources and time for effective suppression? • Are lookouts posted? • Are communications prompt with crews and other resources? • Have escape routes and safety zones been established? • Do you feel comfortable with your assignment?		

To Reduce the Risks: Post lookouts until the fire is sized up and escape routes and safety zones are established, or back off if the situation is too complex!

Initiate All Actions Based on Current and Expected Fire Behavior	• Can the resources you are replacing give you a thorough briefing? • Can you observe the area, use scouts? • Have escape routes and safety zones been thoroughly scouted? • Are they marked for night use? • Have potential dangers been located, can they be dealt with? • Access to weather and fire behavior forecast?		

To Reduce the Risks: Post lookouts, check communications, back off if you have doubts about your escape routes or safety zones or if the situation becomes too complex.

Situation	Considerations	Yes	No
Safety Zones and Escape Routes Not Identified	• Can you identify them by scouting? • Are they large enough for everyone without using fire shelters? • Does the escape route need clearing and/or marking? • How much warning time do you need to get to your safety zone safely? • Does everyone know the escape routes and safety zones? • Can a safety zone be created? • Have you seen the escape routes and safety zones?		

To Reduce the Risks: Back off until you find safety zones or escape routes.

In Country Not Seen In Daylight	• Can the resources you are replacing give you a thorough briefing? • Can you observe the area/use scouts? • Have escape routes and safety zones been thoroughly scouted and marked for night use? • Have potential dangers been located; can they be mitigated?		

To Reduce the Risks: Post lookouts, check communications, back off if you have doubts about your escape routes or safety zones or if the situation becomes too complex.

Fire Not Scouted and Sized Up	• Can you observe personally, or use scouts? • Do you know the location of the fire perimeter? • Do you know the direction of fire spread? • Does the direction of fire spread increase the risk? • Do you know the fuels and their condition? • Do topographic hazards exist? • Does enough information exist to establish a plan of attack? • Do other dangers exist?		

Situation	Considerations	Yes	No

To Reduce the Risks: Post lookouts until the fire is sized up and escape routes and safety zones are established, or back off if the situation is too complex.

Unfamiliar with Weather and Local Factors Influencing Fire Behavior	• Can you ask questions of local experts? • Does the operational period plan give you adequate weather and information? • Can you get information from resources that have been on the fire? • Is there any other way to obtain information?		

To Reduce the Risks: Base all actions on current and expected fire behavior. Post lookouts, establish escape routes and safety zones. Take extra caution!

Uninformed on Strategy, Tactics or Hazards	• Can communications be established to find out? • Can scouting safely identify potential hazards? • Have strategy, tactics or hazards changed since last informed? • Can you get a briefing from your supervisor?		

To Reduce the Risks: Post lookouts, determine escape routes and establish safety zones. Consider backing off until you are informed. Don't leave a staging area or operational briefing until you have all the pertinent information.

Situation	Considerations	Yes	No
Instructions and Assignments Not Clear	**Giving Instructions** ● Did they ask questions? ● Did they take notes? ● Did they repeat information back? ● Did you give all the necessary information: task, location, communications, hazards, who, when, etc. **Receiving Instructions** ● Did you really listen? ● Did you understand the assignment, location, and the nature and location of hazards?		

To Reduce the Risks: Take the time to get it right! **You must know the location of the assignment, what** is to be done, **who** you are to report to and **how** often to report, **when** you are expected to complete the assignment, plus any hazards, communication plan frequencies, weather and fire behavior, and status of adjoining forces.

No Communication Link with Crew Members Supervisors & Adjoining Forces	● Can communication be established? ● Is the communication triangle complete?		

To Reduce the Risks: If the situation is complex, back off until communications are in place.

Constructing Line without a Safe Anchor Point	● Can you hold the line without the fire hooking under you? ● Are there adequate safety zones and escape routes? ● Can you develop your starting point into an anchor point? ● Have you posted good lookouts? ● Do you have good communications?		

Situation	Considerations	Yes	No

To Reduce the Risks: Start the line in another location.

Attempting a Frontal Assault on a Fire	• Has the fire been scouted and sized up? • Is your position defensible? • Are escape routes and safety zones adequate? • Do you have an anchor point? • Do you have adequate resources to complete the assault? • Are you informed on strategy, tactics, and hazards? • Is the terrain favorable to holding the fire?		

To Reduce the Risks: Reassess your tactics, post lookouts.

Building Fireline Downhill with Fire Below	• Has the area been scouted for fire perimeter and behavior? • Will wind direction be at your back? Will it stay at your back? • Is the area free of chimneys and gullies? • Are there adequate safety zones and escape routes as you progress downhill? • Can you carry your burnout downhill as you go–to provide an anchor point and safety zones? • Have lookouts been posted? • Do you have good communications, especially with lookouts and crews working towards you? • Can the line be completed and burned out before the fire reaches the line? • Do you have adequate resources to complete the assignment? • Is the aerial support available if needed? • Has everyone been briefed on the assignment, fire behavior, weather, communications, escape routes and safety zones, hazards, and tactics?		

Situation	Considerations	Yes	No

To Reduce the Risks: If the answer is "No" to any of these questions, consider other tactics and provide for safety first. Never compromise escape routes to safety zones for the sake of building line.

Unburned Fuel Between You and the Fire	• Can you see the fire? Is fire spread in a direction away from you? • Will your position be defensible when the fire reaches you? • Is your line anchored? • Are your escape routes and safety zones adequate?		

To Reduce the Risks: Post lookouts; consider a different location.

Cannot See the Main Fire, Not in Contact with Anyone Who Can	• Are you informed on expected fire behavior and weather? • Do you have safety zones and escape routes? • Will you receive adequate warning to go to your safety zone? • Are you informed on strategy, tactics, and hazards?		

To Reduce the Risks: Re-evaluate your position; limit your exposure.

On a Hillside Where Rolling Material Can Ignite Fuel Below	• Can you locate/construct a line to prevent material rolling below? • Will you get enough warning of rolling material to prevent being hit by it? • Can you see where any material that rolls below you goes and what it does? • Is the area free of large amounts of flashy fuels? Is the area free of chimneys, gullies, and steep • slopes? Do you have two escape routes so you can go • either way?		

Situation	Considerations	Yes	No

To Reduce the Risks: Post lookouts; consider locating line in a defensible position.

Weather is Getting Hotter and Drier	• Do you have a workable plan if fire behavior increases? • Do you have a plan if the fire reaches you earlier than expected? • Is the method of spread the same? • Are your escape routes and safety zones still adequate? • Will you have adequate warning if you need to use the safety zones?		

To Reduce the Risks: Take weather observations more frequently. Base all Actions on Current and Expected Fire Behavior. Reexamine your plan and Risk Analysis as fire behavior increases. Post more lookouts, if more warning time is needed.

Wind Increases or Changes Direction	• Is the wind at your back? Will it stay at your back? • Do you know what you will do if the fire reaches you faster than expected? • Are escape routes and safety zones still adequate? • Do you still have adequate warning time? • Will you be able to handle any additional spotting? • Is there little probability of the fire hooking around you? • Can you still carry out your strategy and/or tactics?		

To Reduce the Risks: Re-examine your situation. Base all Actions on Current and Expected Fire Behavior. If fire behavior increases you must re-examine your plan and Risk Analysis.

Situation	Considerations	Yes	No
Getting Frequent Spot Fires Across the Line	• Can you handle increased spotting? • Do you have a plan for long range spotting? • Is help available if necessary? • If fire behavior increases is your position still defensible? • Do you have more than one safety zone in case one gets cut off? • Do the primary lookouts have a good view of the situation? • Is the primary burning period ending?		

To Reduce the Risks: Be ready to retreat. Keep your guard up even if spotting has not occurred for a few hours.

Terrain and Fuels Make Escape To Safety Zones Difficult	• Does the crew's condition allow for fast travel? • Will you get adequate warning to make it to your safety zone? • Can escape routes be improved to make travel to safety zones faster? Are escape routes marked? • Will posting more lookouts give adequate warning?		

To Reduce the Risks: Consider other tactics that will allow you to be in a safer location.

Taking a Nap Near the Fireline	• Are lookouts posted? • Is the area free of hazards? • Are you still within agency work and rest guidelines? • Does your crew need a break? Have they been pushed too hard?		

To Reduce the Risks: Keep lookouts posted; rotate lookouts. Communicate crew condition and status to supervisor or chain-of-command contact.

The more "**No**" answers, the higher the probability of being entrapped.

If the plan depends on everything going perfectly, ask, "What if? Is something else better–are their safer strategies and tactics?" Ask, "What am I protecting?" Remember: there is no value worth the risk of exposing crew(s) to a situation with a high possibility or probability of entrapment.

In situations of low complexity you may be able to do your risk analysis in your head. However, as the situation gets more complex (i.e., more hazards or higher probabilities), do the Risk Analysis on paper to make sure you recognize the potential danger, and take proper steps to ensure safety through briefings and status updates.

Escape Routes and Safety Zones

An **Escape Route** is "a preplanned and understood route firefighters take to move to a Safety Zone or other low-risk area."

A **Safety Zone** is "a preplanned area of sufficient size and suitable location that is expected to protect fire personnel from known hazards without using fire shelters."

Identification of Escape Routes and Safety Zones is one of the primary responsibilities of any wildland firefighter working on or near the fireline. The following guidelines can be used when selecting Safety Zones:

- Calculations indicate that for most fires, Safety Zones must be wider than 164 feet to ensure firefighter survival.
- The calculation to determine Safety Zone radius is four times the maximum flame height plus 50 square feet per firefighter, or an additional four feet of radius per firefighter. This calculation provides the radius of the Safety Zone, meaning the Safety Zone diameter should be twice the value of the above formula.
- If potential for the fire to burn completely around the Safety Zone exists, the diameter should be twice the values indicated above.
- Factors that will reduce Safety Zone size include reduction in flame height by thinning or burnout operations, shielding the Safety Zone from direct exposure to the flame by locating it on the lee side of ridges or other geographic structures, or reducing flame temperatures by applying fire retardant to the area around the Safety Zone.
- All firefighter PPE must be worn.

- Keep in mind that these guidelines do not address convective energy.

Standard Safety Flagging

The NWCG has established the following standard for wildland fire (prescribed and suppression) activities:

Safety Zones/Escape Routes lime green, flourescent, biodegradable 1" wide (NFES 0258). When flagging no longer shows valid escape routes/safety zones, remove it immediately.

Hazards yellow w/black diagonal stripes, flourescent, biodegradable 1" wide (NFES 0267).

Common Denominators of Fire Behavior on Tragedy Fires

- Most incidents happen on the smaller fires or on isolated portions of larger fires.
- Most fires are innocent in appearance before unexpected shifts in wind direction and/or speed results in "flare-ups" or "extreme fire behavior." In some cases, tragedies occur in the mop-up stage.
- Flare-ups generally occur in deceptively light fuels, such as grass and light brush.
- Fires run uphill surprisingly fast in chimneys, gullies, and on steep slopes.
- Some suppression tools, such as helicopters or airtankers, can adversely affect fire behavior. The blasts of air from low flying helicopters and airtankers have been known to cause flare-ups.

Downhill/Indirect Line Construction Guidelines

Management must be aware of the potential hazards of downhill line construction when determining incident objectives and strategies, developing alternatives in the WFSA process, and providing overall direction to incident commanders.

Fireline can be constructed with handtools, mechanized equipment, water, or retardant. Some line, in order to be reliable, must be cut to mineral soil, constructed so as to catch rolling material, and built along the fire's edge.

As a general rule, construct line moving uphill. If there is no practical alternative to constructing line downhill, do so with extreme caution. Many firefighters have lost their lives attacking wildland fires from above. Direct attack methods should be used whenever possible. The following guidelines also apply to fireline that is being constructed some distance from the fire's edge, where fire behavior cannot be observed and responded to.

- The decision is made by a qualified supervisor after evaluating the situation.
- Downhill line construction should not be attempted when fire is present directly below the proposed anchor point.
- The fireline should not lie adjacent to a chute or chimney that could burn out while the crew is in the area.
- Communication is established between the crew working downhill and crews working toward them from below. When neither crew can adequately observe the fire, communications will be established between the crews, supervising overhead, and a lookout posted where the fire can be seen.
- The crew must be able to rapidly reach a Safety Zone from any point along the line if the fire unexpectedly crosses below them.
- A downhill line should be securely anchored at the top. Avoid underslung line if at all possible.
- Line firing should be done as the line progresses, beginning from the anchor point at the top. Go as fast as is safe. The burned out area provides a continuous safety zone for the crew and reduces the likelihood of fire crossing the line.
- Be aware of and avoid the 18 Watch Out Situations.
- Maintain full compliance with the 10 Standard Fire Orders.

Unexploded Ordnance (UXO)

Millions of acres of in the United States contain unexploded ordnance (UXO), most a result of weapons system testing and troop training activities conducted by the Department of Defense. This property includes active military, formerly

used defense (FUD), and base realignment and closure (BRAC) sites. The risks posed by property containing UXO could be great depending on the types and amount of UXO present and how the property is or may be used.

Those who use and manage property with UXO, as well as those responsible for making decisions regarding the property, need information on the risks presented by UXO, options for eliminating or reducing the risks, and factors to be considered in the decision-making process.

A person's ability to recognize a UXO is the first and most important step in reducing the risk posed by a UXO hazard.

The following types of UXO are those most likely to be encountered on active military sites and FUD and BRAC sites:

- Small arms munitions
- Hand grenades
- Rockets
- Guided missiles
- Projectiles
- Mortars
- Projected grenades
- Rifle grenades
- Submunitions
- Bombs

UXO are found in the environment in many different ways depending in part on the specific type of ordnance, when and where it was deployed, how it was deployed, and activities that may have taken place at the locations since deployment.

UXO may be found fully intact or in parts or fragments. All UXO, whether intact or in parts, present a potential hazard and should be treated as such. An UXO that has deteriorated presents a particular hazard because it may contain chemical agents that could become exposed.

UXO Safety and Reporting UXO, whether present in an area by design or by accident, poses the risk of injury or death to anyone in the vicinity.

- **"IF YOU DIDN'T DROP IT, DON'T PICK IT UP!"**
- When you see UXO, stop. Do not move closer.

- Never transmit radio frequencies (including walkie talkies, citizens' band radios).
- Never attempt to remove anything near a UXO.
- Never attempt to touch, move, or disturb a UXO.
- Clearly mark the UXO area.
- Avoid any area where UXO is located.
- Keep a minimum of 500 feet away from any UXO that is on fire.

Report discovery of UXO to your immediate supervisor.

See Risk Assessment/Mitigation for Firefighters Working Around Ordnance in the Appendix.

Hazardous Materials

Purchasing Purchase of hazardous materials (products containing chemicals) should be done using waste minimization principles to prevent surplus of product. Many products are sold with a shelf life that can expire before use if not managed properly. **Material Safety Data Sheets (MSDSs) should be obtained at time of purchase and used as part of safety briefings.**

Use Use of any product containing chemicals must be in compliance with OSHA's Hazard Communication Standard, 29 CFR 1910.1200. The primary elements of that standard require employee training, MSDSs (including hazard determination), inventory of products, and a written hazard communication plan intended to protect employees using the products.

Storage Proper storage of hazardous materials is essential for the protection of employees. This is particularly important in the case of flammables and combustibles. The quantity of product affects storage requirements, and should be considered when purchasing is done. Storage of flammables and combustibles must be in compliance with OSHA 29 CFR 1910.106.

Surplus Avoid the over purchase of products. Surplus products remain in the field, and may create a disposal or use problem for the field office that receives them. Any products left behind after an incident **must** be properly labeled and be accompanied by the appropriate MSDS.

Classification NFPA 704 HazMat Classification descriptions can be found in the *Incident Response Pocket Guide* (PMS 461, NFES 1077).

Safety for Managers Visiting Fires

The BLM's Fire and Aviation Program-wide Management Review Report outlines the need for agency administrators to become actively involved in the management of wildfires, and to "personally visit an appropriate number of escaped fires each year." Personal protective equipment (PPE) is required for certain scenarios. If you have any questions, please discuss them with your fire and aviation management staff.

Visit to Incident Base

The minimum requirements for PPE at an incident base are the same as all field locations. Refer to BLM Manual 1112-2, 3.3, *Safety and Health for Field Operations*:

- 8-inch leather lace boots with non-slip soles and heels
- long trousers
- long-sleeve shirt

The field uniform is excellent; however, for more flexibility you may choose to wear the aramid fire shirts and trousers or flight suit.

Visits to the Fireline

When visiting the fireline, there are two major considerations: required PPE, and the required physical fitness and training requirements which vary based on whether or not the manager is escorted or unescorted. Escorts must be qualified at the Single Resource Boss (Crew or Engine) level.

PPE Required

- 8-inch leather lace boots with non-slip soles and heels
- long trousers made of flame-resistant material
- long-sleeve shirt made of flame-resistant material
- hard hat
- leather gloves
- fire shelter and hand tool

- water canteen and personal first-aid kit

Training and Physical Fitness Requirements

If Escorted: No previous training required. No specific physical fitness requirements; however, managers must be able to walk in mountainous terrain and be in good physical condition with no known limiting conditions. A medical examination (including an exercise electrocardiogram) should be considered if a manager is not physically active or in good health.

If Unescorted: A fitness level of Moderate is required, plus successful completion of the following:

- Introduction to Fire Behavior (S-190)
- Firefighter Training/Standards for Survival (S-130)

Helicopter Observation Flights

Managers who take helicopter flights to observe fires must receive a passenger briefing and wear the following required PPE:

- flight helmet
- leather boots
- fire-resistant clothing
- all leather or leather and aramid gloves

Training Requirements can be met by any of the following courses: B1 Basic Helicopter Safety, B3 Basic Helicopter/Airplane Safety, or, S-270 Basic Air Operations. Occasional passengers have no training requirement, but a qualified flight manager must supervise loading and unloading of passengers.

Fixed-Wing Observation Flights

No PPE is required for managers who take fixed-wing flights to observe fires; however, a passenger briefing is required, and the flight level must not drop below 500 feet AGL.

Training Requirements can be met by any of the following courses: B2 Basic Airplane Safety; B3 Basic Helicopter/Airplane Safety; or, S-270 Basic Air Operations.

Prescribed Fire Safety

For more information on Prescribed Fire see *BLM Manual H-9214-1*, *Prescribed Fire Management Handbook,* and Chapter 6, Prescribed Fire.

Briefings

A personnel briefing will be conducted prior to any prescribed fire activity to ensure those people involved understand the operational procedure and what their individual assignments are. Every person involved in a prescribed fire project is responsible for identifying safety issues and concerns.

Briefings must cover safety considerations for both known site-specific hazards and potential hazards. The development of a briefing checklist and a job hazard analysis (JHA) are required and will be attached to the Prescribed Fire Plan (Burn Plan). Additional components of the Prescribed Fire Plan that have a direct impact on safety are the Go/No Go Checklist, and the Communications Plan.

PPE

All personnel on a prescribed fire project are required to wear the PPE appropriate to their position or as identified in a JHA. For holding and ignition personnel, the minimum PPE (unless otherwise identified in the JHA) is the same as that required for wildland fire assignments.

Smoke Exposure

Exposure to smoke during prescribed fire operations can be a significant safety concern. Smoke exposure on prescribed fires, especially in the holding and ignition positions, often exceeds that on wildfires. The following are ways to mitigate exposure to smoke:

- Use equipment rather than people, when possible, in holding areas (sprinklers, foam, etc.).
- Design burn plans with "maximum allowable perimeter" to permit minor slopovers and to minimize suppression activities.
- Minimize mop-up whenever possible (consider regulatory conflicts regarding hazard tree removal, endangered species, and so forth in risk assessments for fire safety and health).
- Change ignition times and firing patterns to minimize smoke impacts on ignition personnel.
- Address smoke impacts in the JHA.
- Rotate personnel out of heavy smoke areas.
- Adjust prescriptions where possible to reduce smoke by providing more complete combustion.

SAFENET

Reporting unsafe situations in wildland and prescribed fire operations

The Department of Interior agencies and the USDA Forest Service have created and adopted a common reporting form and system to report unsafe situations or close calls in wildland and prescribed fire operations, all-risk incidents, and training events. SAFENET is the "SAFECOM" for on-the-ground fire incidents. SAFENET denotes "safety and health network in fire operations." This new system allows for reporting and resolving unsafe or unhealthful field situations

quickly **and at the level closest to the fire**. Information gathered from the form will also provide important safety-related data to the national center to determine long-term trends and problem areas.

The objectives of the form and process are:

- To provide immediate reporting and correction of unsafe situations or close calls in wildland fire.
- To provide a means of sharing safety information throughout the fire community.
- To provide long-term data that will assist in identifying trends.
- Primarily intended for wildland and prescribe fire situations; however, SAFENET can be used for training and all-risk events.

Individuals who observe or who are involved in an unsafe situation should initiate corrective action, if possible, and then report the occurrence immediately (within 48 hours) using SAFENET. You are encouraged, but not required, to put your name on the report.

If you are not in a position to take corrective action, the report shall be forwarded to the immediate supervisor, whose responsibility it is to resolve the situation, or to the next level supervisor who can mitigate the unsafe situation. However, the report can be submitted to any level in the organization.

Anyone receiving a SAFENET is responsible for initiating action to correct the unsafe situation. Completed reports shall be forwarded to the state/regional level Fire Manager within seven (7) days, and to the national center within 30 days. There is no punishment or penalty for filing a SAFENET. SAFENET submissions may be done anonymously; however, this may delay corrective action.

Prompt replies to the originator (if name provided), timely action to correct problems, and discussion of filed SAFENETs at local level meetings encourage program participation and active reporting.

SAFENET does not replace agency accident reporting criteria. See the SAFENET form in the Appendix.